cashire and Yorkshire, and have never been properly described; while the liberality of several American paleontologists, especially Mr. Charles Wachsmuth of Burlington, has enabled the authors to make their work a nearly complete monograph of the group. They recognize nineteen genera, which are arranged into six families, and these fall into two orders, the Regulares and Irregulares. The latter contains the singular Devonian genus eleutherocrenies, which was so well described by the late Dr. Shumard, together with two equally aberrant types from the carboniferous of England and Ireland respectively. These three genera differ altogether from the familiar Pentremites in having no trace of a stem and in the asymmetry of the calyx.

The reports recently made to the local government board by public analysts indicate in a very striking way the good effected by the adulteration act of 1875 as regards food and drugs. When public attention was first directed to this question (by the *Lancet*), one-half the samples of food analyzed were found to be adulterated. The returns for a twelvemonth, just published, show that only 13.2 per cent had been thus tampered with. The adulteration seems greatest in spirits, being 537 out of 2.321, or 23.1 per cent. Butter comes next, with 18.8 per cent. Then follow in order, coffee, mustard, and milk. The adulteration of bread has almost ceased, only 31 samples out of 1,168 tested (not 3 per cent) being faulty. Confectionery and beer are practically unadulterated, while not a single suspicious case occurred among the numerous samples of flour, sugar, pickles, tinned vegetables, jam, and wine, which were examined.

There are many signs that the electric lighting industry, so long under a cloud, has at last taken a very decided turn in the right direction, notwithstanding the fact that the removal by parliament of the legislative restrictions imposed upon it by the electric lighting act of 1882 seems as far off as ever. Numerous celebrations are projected in connection with the jubilee year of the accession of Queen Victoria, in many of which the electric light is to play a very prominent part. The battle of the patents still continues in connection with incandescent lamps, a monopoly in the manufacture of which is claimed by the Edison company, and is stoutly opposed by a number of manufacturers, headed by Messrs. Woodhouse and Rawson, who, beaten in the first trial, have appealed against the judgment of the courts, and will probably carry the matter, if necessary, up to the house of lords. That great competitor of the electric light, the gas industry, is now seriously hampered by the difficulty in disposing of its tar. The quantity of coal carbonized for gas-making in the United Kingdom is about 8,450,000 tons per year; and if the yield of tar be taken at 12.5 gallons per ton, specific gravity 1.165, it follows that 558,780 tons of tar are annually produced. Attention, therefore, is being directed to the best conditions under which tar can be burnt as fuel; and its injection into the furnace by means of steam, with an atomizing apparatus, is found to be one of the best methods. Such 'tar-steam' evaporates 10.7 pounds of water per pound of fuel, as against from 7 to 8 pounds evaporated by 1 pound of coal. W.

London, Oct. 13.

## NOTES AND NEWS.

CORNELL university, taking up the plan outlined by President Adams last spring, will establish a law school, with a course of study extending over two years. The faculty will consist of a resident dean, a professor and an assistant professor, together with non-resident professors of special subjects. The faculty will be chosen in January, 1887, and a formal announcement of the new school will be made at that time. Cornell reports this fall 33 graduate students and 304 freshmen. The total enrollment is 794.

— Dr. Wiedermann, so long the amanuensis and pupil of von Ranke, is in an asylum near Berlin. He suffered so much from overwork on the last volume of Ranke's history, and from the nervous excitement attending the last illness and death of his master, that his mental powers became unsettled.

— The first of the Lowell free courses of lectures in Boston this winter given under the auspices of the Teachers' school of science of the Boston society of natural history, will be by Prof. W. M. Davis of Harvard college, on 'Problems in physical geography.' The program is as follows: — first and second lectures, 'Geographical classification,' illustrated by the classification of lakes according to the mode of origin of their basins; third lecture, 'Geographical evolution,' illustrated by the development of plains, plateaus, and their derivatives; fourth and fifth lectures, 'Geographical evolution, as seen in the volcanic series of geographic forms, all structures consisting of rock thrust up while molten from a deep subterranean source may be considered under this heading; the characteristic series of topographic forms developed during their wasting-away will be described. The lectures will be illustrated by maps, diagrams, and models: they will be given, as usual, in Huntington hall, at the Massachusetts institute of technology, beginning on Nov. 6.

— The council of the University of the city of New York has chosen Mr. Charles Butler to fill the office of president, made vacant by the resignation of Mr. John Taylor Johnston on account of ill health. The university has this year a total of 800 students, — 70 in the law school, 600 in the medical school, and 130 in the college proper.

— According to Prof. F. H. Snow of the University of Kansas, from observations taken at Lawrence, last month, with one exception (1879), was the warmest October in nineteen years. The rainfall was but little more than half the average, this being the fifth successive month with deficient rainfall. The total rainfall from Jan. 1 to Nov. 1 was more than two inches less than for the same period in any previous year of our record.

— Messrs. Cupples, Upham & Co., Boston, announce 'Harvard : the first American university,' by George Gary Bush, Ph.D.

— Mr. Percy Fitzgerald has just published, through Messrs. Scribner & Welford, New York, "The book fancier ; or, The romance of book collecting."

— Messrs. Ticknor & Company announce for publication, on Nov. 6, 'A muramasa blade,' a story of feudalism in old Japan, by Louis Werthеimber ; also monographs of American architecture, No. 4, 'The memorial hall at Harvard university,' Ware & Van Brunt, architects, 13 gelatine plates (from nature) 13x16 inches, also one photo-lithograph, in portfolio.

— *Nature* states that Messrs. Taylor and Francis of London will shortly publish a work by Mr. T. Mellard Reade, F.G.S., entitled 'The origin of mountain-ranges.' In addition to containing a systematic theory of mountain-building, with detailed experimental illustrations, the structure and geological history of the great mountain-masses of the globe will be discussed. The work will also contain many maps and sections of mountain-ranges, and a contoured map of the North Atlantic Ocean, together with numerous sketches of mountain-structure and scenery, from nature, by the author.

— At the close of the present year *Van Nostrand's engineering magazine* will pass into the hands of Mr. M. N. Forney, and be consolidated with the *Railroad journal*, which has also become the property of Mr. Forney. In January the magazine will appear in its new form, under the somewhat formidable title of the *American engineering magazine and railroad journal.* An editorial and news department will be added, more illustrations will be given, the pages will be enlarged, and the price reduced to three dollars per year.

— An opportunity for the publication of geographic studies and monographs is offered in a series of volumes, to be entitled '*Geographische abhandlungen*,' edited by Prof. Albrecht Penck, and published by Hölzel of Vienna, — two names that insure good material and good work. The *Abhandlungen* are designed to contain essays that are too long for acceptance in *Petermann's mittheilungen* or in the Berlin *Zeitschrift für erdkunde*, unless in disjointed form, and to continue such studies as were encouraged in Kettler's *Zeitschrift für wissenschaftliche geographie.* The papers promised for this year are by Brückner, on 'The glaciation of the Salzach district ;' Neumann, on 'Orometry of the Black Forest ;' and Böhm, on 'The division of the eastern Alps.'

— A gold medal and money amounting to $165 have been offered by a scientific society of Holland for the best treatise on the work of Pasteur.

— Twenty-five thousand dollars have already been expended in digging an artesian well at Northampton, Mass., and although a depth of 3,024 feet has been attained water has not been found in quantity sufficient to be of use.

— It may be cited as an evidence of the prevalence of morbid curiosity, that the first edition of Inspector Byrne's forthcoming book on the 'Professional criminals of America' has been exhausted by advance orders, and a second edition of five thousand copies is on the press.

— The death is announced of Prof. H. A. Bayne, Ph.D., of the Royal military college, Kingston, Ontario. Professor Bayne was a native of Nova Scotia, and after graduating at Dalhousie college, Halifax, studied under Liebig, Bunsen, and Dumas.

— The population of Queensland, Australia, was on the 31st of December, 1885, 326,916, of whom 191,450 were males, and 135,466 females. This is an increase of about 17,000 over the population in December, 1884.

— Dr. H. G. Beyer, U.S.N., has recently been repeating Hueppe's experiments as to the causation of lactic acid fermentation, or the process of the souring of milk. Lister believed that this was caused by a microbe, and proved it satisfactorily. Dr. Hueppe has demonstrated that there is a particular organism, described by him as bacillus lactic, which is constantly associated with lactic acid fermentation, and he has separated this organ-

ism from others. The experiments of Hueppe and Beyer appear to have demonstrated that during lactic acid fermentation the sugar of the milk is converted into lactic and carbonic acids, and that this process is directly dependent on or caused by the life and growth of a micro-organism which so differs from all others that it may properly be named bacterium lactis. This is a short, thick, ovoid rod, about half as broad as long, from .001 to .002 mm. in length. The germ does not liquefy gelatine. It is as yet undetermined whether it forms spores.

— Professor Cantani some months ago recommended the inhalation of a spray consisting of a pure culture of bacterium termo for the cure of consumption. This method of treatment was fully described in the *British medical journal* some time ago. Dr. Filipovitch of Odessa has recently tried this plan upon six cases of advanced consumption. Four of the patients died, and the other two left without having been perceptibly benefited. He came to the conclusion as the result of his personal observation that no good whatever may be expected from the treatment of tuberculosis by the inoculation of the bacterium termo. In one of the cases the expectoration became more profuse and offensive after the treatment was commenced, and it is questionable whether harm may not be done by inhaling these bacteria of putrefaction.

— The *Medical record* is authority for the report that Professor Windle concludes from his researches that man's original dentition included six incisors in either jaw; that two from each jaw have gradually disappeared; that this loss is due to the contraction of the anterior part of the palate; that this process of contraction will probably go on and result in the loss of two further incisors, and that the conical shape of many of the supernumerary teeth indicates a reversion to the primitive type of tooth.

— The sale of nickel-plated cooking-vessels has been prohibited in Lower Austria on the ground that vinegar and other food substances dissolve the nickel, producing a poison.

— The bacillus of bread-fermentation has been cultivated by Laurent (*Bull. acad. roy. Belg.* x. 763) and described under the name of B. panificus. The spores are found on the surface of grain and remain in the flour when ground. They develop rapidly in dough, as well as in gelatine, saccharose, and boiled starch, and are capable of withstanding the temperature of boiling water, when not situated within a half inch of the surface of the bread while cooking. The bacilli occur richly in bread, and may be found in great numbers in the intestinal canal. In bread they may attack the starch, converting it into a substance resembling erythrodextrine, and producing a viscosity or heaviness, easily checked, however, by the addition of a quantity of an organic acid.

— Dr. W. Müller describes in *Kosmos* the remarkable habits of a Brazilian long-horn beetle (Oncideres) of less than an inch in length, which gnaws off branches, from one to two inches in diameter, of the hard-wooded camphor-tree, for the purpose of inserting its eggs into the twigs, which is done after the branches have fallen to the ground.

— A successful attempt at crossing wheat and rye is mentioned in Biedermann's *Centralblatt*. The grain capsules of the wheat were carefully opened, and the stamens removed before they were developed. The pollen from the rye was afterwards placed upon the stigmas, and the whole head carefully tied up. The seeds resulting from this process were planted and readily germinated, producing plants that partook of the characters of both parent forms, though with those of the wheat predominating. Some of the ears had long glumes, while others had short ones. The seeds themselves showed a resemblance to rye, but less than to wheat.

— A strange effect of light transmitted through a solution of sulphate of quinine upon the blossoming of plants has been made known by Sachs. From a series of experiments he has shown that plants germinated and grown under the influence of such light, while thriving otherwise, develop only small, imperfect, and speedily perishable flowers. Light transmitted in a similar way through pure water impaired in no way the blossoming powers.

— Since the discovery of the independence of the physiological senses of heat, pain, cold, and touch, a special interest has attached to the ascertainment of the different ways in which these sensations are transmitted to the brain. Professor Herzen has recently shown (*Arch. sc. phys. et nat.* xv. 580), from vivisectional experiments, the intimate relation between cold and touch, and that an injury to the cortex of the brain that destroys the sense of touch in any region will usually also abolish correspondingly the sense of cold. Accidentally, however, in one case, through cutting less deep than he had intended, he found that the sense of cold was abolished while that of touch remained uninjured, proving the ultimate distinction between the brain centres of these two senses.

— Dr. M. J. Roberts of New York, after drilling holes in bone to investigate the existence of diseased conditions, introduces a small incandescent lamp of half-candle power into the opening, and by this means illuminates the cavity.

## LETTERS TO THE EDITOR.

***Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

### The source of the Mississippi.

The recent discussion, in your columns and elsewhere, of the sources of the Mississippi River, must have suggested to many of your readers the thought that this is an especially fitting time to supplement and complete the work of the early explorers and the government surveyors by a careful examination of the Itasca basin in the light of all previous explorations. There are certain elements in the region that are permanent, and certain others that are temporary and will soon undergo the changes which accompany the settlement and subjection of the wilderness. The Lake Itasca of Schoolcraft and Nicollet, in the main, survives to the present day. A few years more will see many of its features changed past recognition.

If such an exploration is worth the making, it should not be long delayed; and that it is well worth making, the interest of the public already enlisted in this discussion clearly proves. Further, the fact that a mere adventurer and charlatan has been able to lead astray and befog the press and the scientific bodies of almost the entire country, east and west, is no small proof that it is desirable to settle, once for all, the questions at issue.

We have taken this view of the case ever since Captain Glazier's friends first presented his claims for our consideration. The matter was fully investigated by the head of our editorial department, and we became satisfied that nothing short of a thorough exploration of the region in question would satisfy us as educational publishers or justify us in making any changes in our geographical publications. We believe that we, as publishers of geographies and atlases which are widely used and approved, owe this much of service to the public. We therefore some weeks ago arranged to dispatch a competent exploring party to Lake Itasca, fully equipped with instruments for the complete survey and delineation of the region which supplies the feeders of the lake.

The first letters from this expedition are at hand, and consist of a general statement of the character of the work accomplished. The detailed report we expect will be forwarded to us in the course of a week or two, when we shall be glad to place them at the service of your readers as soon as the proper maps can be drawn and engraved. The following extracts from a letter before us shows the nature of the work accomplished: —

"Every stream flowing into Lake Itasca and Elk Lake was followed to its source and located. The area drained by each stream was found, as well as the volume of water discharged. The heights of land were located and elevations taken, as well as the elevation of the sources of all the streams flowing into both lakes."

We have also received by express specimens of the water from both lakes, and a number of small evergreen trees taken from Schoolcraft Island and from various points on the shores of Itasca.

Our instructions were that the exploration be made so thorough as to satisfy every inquiry, and we believe that it has so been made.

Ivison, Blakeman, Taylor & Co.

New York, Nov. 3.

### On the figures illustrating zoological literature.

In the course of some remarks on the figures illustrating zoölogical literature in *Science* for Oct. 29, Dr. R. W. Shufeldt justly pleads that proper credit be given to original authors of zoölogical illustrations; but in the course of his remarks he occupies considerable space in accusing me of carelessness in such matters, in the case of my 'Zoölogy' and 'First lessons in zoölogy.' I am charged with making 'a very shiftless acknowledgment of some of the authorities for the illustrations.' I am surprised at this reckless statement, as I intended to, and think I did, make full, proper, and circumstantial acknowledgment of the authorities and works from which most of the cuts were borrowed. Over two-thirds of a page of the preface is devoted to such acknowledgment, and a paragraph is given to the names of standard authors and their works. I regret to learn that two sketches drawn by Dr. Shufeldt himself were not credited. The mistake can easily be corrected in a second edition. I have prided myself on giving proper credit, on this and other occasions, to other naturalists and authors, and to those who have in other ways been of assistance.

Now, let us see if Dr. Shufeldt has been as careful, exact, and guarded as a critic should be. He lectures me for not, in my larger 'Zoölogy,' giving credit to the original artist as well as the author of the book who borrowed the figure. If Dr. Shufeldt had carefully looked through the larger 'Zoölogy,' he would have found that I had done so in the case of twenty figures (figs. 63, 75, 109, 141, 232, 279, 280, 284, 386[6], 387, 394, 434, 437, 457, 460, 461, 491, 500, 515, 516). Now, is this fair, candid criticism? Do not Dr. Shufeldt's sweeping statements, like those of another critic of the 'First lessons,' mislead the reader? Is such carelessness just to the author of the book?

Again: Dr. Shufeldt states that at least fourteen of the cuts from either Audubon or Wilson are accredited to Coues's 'Key.' This statement is based on an inspection of the first edition of the 'Zoölogy:' in the third and later editions, thirteen of these figures are credited to Tenney's 'Zoölogy.' Our critic should refer to the latest edition of the work with which he finds fault. It has certainly, however, been my wish to credit the figures borrowed to the original artist. It is not alway easy to do so in copying from foreign works: in the case of Audubon and Wilson it could have been done, and may be in a later edition.

Coming to the 'First lessons in zoölogy,' Dr. Shufeldt charges me with ignoring the artists in a large number of figures. In the preface I say, "Of the 265 woodcuts, 111 have not appeared in the author's other books." Subtracting 111 from 265, leaves 154 figures. The sources of these are acknowledged in my two larger books; i.e., the 'Zoölogy,' and the 'Briefer zoölogy.' It seemed to me unnecessary to make the acknowledgment again in a smaller book designed for younger pupils. If this was an error, it was not from an intention to mislead. Leaving out the 154 figures previously acknowledged, then taking into account over 100 fully acknowledged, it would be easy for the critical reader to detect the eight figures